ecology and environment, inc.
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International Specialists in the Environment

MEMORANDUM

DATE: April 14, 1988

TO: [redacted] FIT-RPO, USEPA, Region X

FOR: Joyce Crosson, RSCC, USEPA, Region X

THRU: Jeffrey Villnow, FIT-OM, E&E, Seattle JV

FROM: James Herndon, Chemist, E&E, Seattle JEH
Andrew Hafferty, Senior Chemist, E&E, Seattle AH

SUBJ: QA of Case 8955 (Inorganics)
Spokane Junkyard

TDD: F10-8802-07

CC: Raleigh Farlow, ESD-DPO, USEPA, Region X
Gerald Muth, DPO, USEPA, Region X, Laboratory
Deborah Szaro, ESD-DPO, USEPA, Region I
Deborah Flood, HWD-SM, USEPA, Region X
Joseph Hunt, PM, E&E, Seattle

The Quality Assurance review of four samples, Case 8955, collected from Spokane Junkyard, has been completed. The four soil samples were analyzed at low level for TCL inorganics by* Thermo Analytical Inc. of Waltham, MA. The samples were numbered:

EPA Number	Lab Number
MJB-764	02022-01s
MJB-765	02022-02s
MJB-766	02022-03s
MJB-767	02022-04s

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control specifications outlined in IFB WA 87-K-025, IFB WA 87-K-026 and IFB WA 87-K-027.

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* Skinner and Sherman Laboratory is a Division of Thermo Analytical Inc.
Inc.

1) Timeliness - Acceptable

Sample Number	Sample Date	Recd. Date	ICP Prep.	ICP Anal.	AA Prep.	AA Anal.	Hg Anal.
MJB-764	02/12	02/13	02/24	03/03	02/24	03/16-19	03/01
MJB-765	02/12	02/13	02/24	03/03	02/24	03/16-19	03/01
MJB-766	02/12	02/13	02/24	03/03	02/24	03/16-19	03/01
MJB-767	02/12	02/13	02/24	03/03	02/24	03/16-19	03/01

All samples met contract required holding times.

2) Initial Calibration - Acceptable

The Initial Calibration Verification (ICV) standard was run two times. The first run had an unacceptable value for Arsenic. The value used in the Initial Calibration form was taken from the second Initial Calibration Verification standard.

The Arsenic and Selenium values listed for the first initial calibration (Form IIA page 7 of data packet) were not the correct values. The correct values taken from raw data are listed below:

Compound	Reported	Reported % R	Actual	Actual % R	QC Limit
Arsenic	47.41 ppb	100.9%	37.93 ppb	80.7%	90-110%
Selenium	101.05 ppb	97.2%	80.84 ppb	77.7%	90-110%

%R = Percent Recovery

The Percent Recovery (%R) for Arsenic and Selenium in the Initial Calibration Verification (ICV) of 03/38/88 were outside of the contract required limits. No samples were run on that day. No flagging of data was required.

3) Continuing Calibration - Acceptable

All ICP and Graphite Furnace Continuing Calibration Verification (CCV) standards met requirements for frequency and percent recovery for all metals.

4) Instrument Detection Limits - Acceptable

Instrument Detection Limits (IDL) met Contract Required Detection Limits (CRDL) for all metals.

5) Blanks - Acceptable

Negative values were entered on the Blank form and flagged incorrectly as being between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL). The values have been treated as detection limit values in those cases.

The following elements were found in the Preparation Blank:

Element	Concentration
Iron	5.1 ppm
Potassium	66.0 ppm
Sodium	51.9 ppm

The values reported were greater than the Instrument Detection Limit (IDL) but less than the Contract Required Detection Limit (CRDL). No flagging of the data reports was necessary.

6) ICP Interference Check - Acceptable

The Interference Check elements met contract required limits for recovery.

7) Laboratory Control Sample - Acceptable

All elements in the Laboratory Control sample had recoveries within contract limits calculated for soils.

8) Duplicate Sample Analysis

The following elements at concentrations five times greater than the Contract Required Detection Limit (CRDL) had Relative Percent Difference (RPD) values greater than 35%. Elements at concentrations less than five times the Contract Required Detection Limit (CRDL) had Relative Percent Difference (RPD) within the ± CRDL limit.

Sample	Matrix	Element	RPD	QC Limits
MJB-764	Soil	Zinc	35.7%	35%

RPD = Relative Percent Difference
QC Limit = 35% if sample is greater than 5 times CRDL (soil)

Positive values for Zinc have been flagged "J" (estimated) for all samples.

9) Spiked Sample Analysis

The recovery values for Arsenic, Lead, Mercury, Selenium and Silver were outside of QC limits.

Sample	Matrix	Element	%R	QC Limits
MJB-765	Soil	Arsenic	175.8	75 - 125%
MJB-765	Soil	Lead	71.6	75 - 125%
MJB-765	Soil	Mercury	127.0	75 - 125%
MJB-765	Soil	Selenium	3.2	75 - 125%
MJB-765	Soil	Silver	64.0	75 - 125%

%R = Percent Recovery

Percent Recovery (%R) for Arsenic and Mercury was greater than 125%. Positive results for Arsenic and Mercury have been flagged "J" (estimated) for all samples.

Percent Recovery (%R) for Lead and Silver was less than 75%. Positive results for Lead and Silver have been flagged "J" (estimated) and detection limits flagged "UJ" (undetected, estimated quantitation limit) for all samples.

Percent Recovery (%R) for Selenium was less than 30%. Positive results for Selenium have been flagged "J" (estimated) and detection limits flagged "UR" (undetected, rejected quantitation limit) for all samples.

10) ICP Serial Dilution

Sample	Element	%D	QC Limit
MJB-766	Copper	22.8	10%

%D = Percent difference

The Percent Difference (%D) for Copper in the serial dilution was greater than 10%. Positive results for Copper have been flagged "J" (estimated).

11) Furnace AA - Acceptable

The sequence for sample and analytical spike analysis was within contract requirements for Relative Percent Difference (RPD) for duplicate analysis and Spike Recoveries for spikes at twice the Contract Required Detection Limit.

Method of Standard Addition (MSA) Analysis

Arsenic analyses for samples MJB-764 and MJB-765 were done by the Method of Standard Addition (MSA) and did not meet the contract required 0.9950 linear coefficient (r) requirement.

Sample	Element	r	QC Limit
MJB-764	Arsenic	0.9945	0.9950
MJB-765	Arsenic	0.9803	0.9950

r = Correlation Coefficient

Positive results for Arsenic have been flagged "J" (estimated) in samples MJB-764 and MJB-765.

12) Mercury Analysis - Acceptable

Mercury analyses met all contract requirements for frequency of quality control and analytical sequence.

13) Cyanide Analysis

Cyanide analysis was not requested for this sample set.

14) Sample Analysis - Acceptable

15) Laboratory Contact

No contact was required.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (R-582-5-5-01).

Upon consideration of the above comments, the data is ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of individual values.

Additional data packages associated with this project are expected from CLP or EPA laboratories.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is an estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met or concentrations reported were less than the CRQL.

R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

B - The compound was found in the laboratory blank as well as the sample.

Data Qualifiers (Cont.)

M - Mass spectral criteria for positive identification were not met. However, in the opinion of the laboratory, the identification is correct based on the analyst's professional judgement.

F - Concentration of this compound exceeds either the primary or secondary drinking water standard listed in the Safe Drinking Water Act of 1974.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB764

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-W8-0006

Lab Code: SKINER Case No.: 3955 SAS No.: SDG No.: MJB764

Matrix (soil/water): SOIL Lab Sample ID: 02022-013

Level (low/med): LOW Date Received: 02/13/88

% Solids: 74.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14100.00			
7440-36-0	Antimony	4.30	U		
7440-38-2	Arsenic	7.20	J		
7440-39-3	Barium	122.00			
7440-41-7	Beryllium	0.42	J		
7440-41-7	Cadmium	0.66	U		
7440-70-2	Calcium	5740.00			
7440-47-3	Chromium	16.90			
7440-48-4	Cobalt	8.10	J		
7440-50-8	Copper	30.60	J		
7439-89-6	Iron	18300.00			
7439-92-1	Lead	36.70	J		
7439-95-4	Magnesium	5880.00			
7439-96-5	Manganese	401.00			
7439-97-6	Mercury	0.13	U		
7440-02-0	Nickel	12.30			
7440-09-7	Potassium	2860.00			
7782-49-2	Selenium	1.10	WR		
7440-22-4	Silver	1.00	UJ		
7440-23-5	Sodium	144.00	J		
7440-28-0	Thallium	0.40	U		
7440-62-2	Vanadium	25.50			
7440-66-6	Zinc	608.00	J		
	Cyanide				

JSH 4/14/88

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: BROWN Clarity After: _____ Artifacts: YES

Comments:

LARGE STONES, GRASS AND ROOTS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB765

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-W8-0006

Lab Code: SKINER Case No.: 3955 SAS No.: SDG No.: MJB764

Matrix (soil/water): SOIL Lab Sample ID: 02022-028

Level (low/med): LOW Date Received: 02/13/88

% Solids: 33.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15100.00			
7440-36-0	Antimony	3.90	U		
7440-38-2	Arsenic	7.30	J		
7440-39-3	Barium	112.00			
7440-41-7	Beryllium	0.34	J		
7440-41-7	Cadmium	0.53	U		
7440-70-2	Calcium	2910.00			
7440-47-3	Chromium	16.50			
7440-48-4	Cobalt	7.60	J		
7440-50-8	Copper	38.60	J		
7439-89-6	Iron	20400.00			
7439-92-1	Lead	68.20	J		
7439-95-4	Magnesium	7910.00			
7439-96-5	Manganese	431.00			
7439-97-6	Mercury	0.11	U		
7440-02-0	Nickel	12.40			
7440-09-7	Potassium	2630.00			
7782-49-2	Selenium	0.26	WR		
7440-22-4	Silver	1.60	U J		
7440-23-5	Sodium	234.00	J		
7440-28-0	Thallium	0.24	U		
7440-62-2	Vanadium	22.50			
7440-66-6	Zinc	99.20	J		
	Cyanide				

J SH 4/14/88

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: BROWN Clarity After: _____ Artifacts: YES

Comments:

LARGE STONES AND ROOTS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB766

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-W8-0006

Lab Code: SKINER Case No.: 3955 SAS No.: SDG No.: MJB764

Matrix (soil/water): SOIL Lab Sample ID: 02022-038

Level (low/med): LOW Date Received: 02/13/88

% Solids: 76.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	16400.00			
7440-36-0	Antimony	3.70	U		
7440-38-2	Arsenic	3.50	J		
7440-39-3	Barium	165.00			
7440-41-7	Beryllium	0.58	J		
7440-41-7	Cadmium	1.10			
7440-70-2	Calcium	4450.00			
7440-47-3	Chromium	24.80			
7440-48-4	Cobalt	9.20			
7440-50-8	Copper	49.20	J		
7439-89-6	Iron	24000.00			
7439-92-1	Lead	128.00	J		
7439-95-4	Magnesium	4820.00			
7439-96-5	Manganese	469.00			
7439-97-6	Mercury	0.12	U		
7440-02-0	Nickel	17.10			
7440-09-7	Potassium	2870.00			
7782-49-2	Selenium	0.42	UR		
7440-22-4	Silver	1.50	UJ		
7440-23-5	Sodium	330.00	J		
7440-28-0	Thallium	0.39	U		
7440-62-2	Vanadium	29.60			
7440-66-6	Zinc	137.00	J		
	Cyanide				

JSH 4/14/88

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:

LARGE STONES AND ROOTS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB767

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-W8-0006

Lab Code: SKINER Case No.: 3955 SAS No.: SDG No.: MJB764

Matrix (soil/water): SOIL Lab Sample ID: 02022-04S

Level (low/med): LOW Date Received: 02/13/88

% Solids: 79.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12900.00			
7440-36-0	Antimony	3.90	U		
7440-38-2	Arsenic	5.00	J		
7440-39-3	Barium	125.00			
7440-41-7	Beryllium	0.34	J		
7440-41-7	Cadmium	0.53	U		
7440-70-2	Calcium	3300.00			
7440-47-3	Chromium	18.10			
7440-48-4	Cobalt	6.90	J		
7440-50-8	Copper	45.70	J		
7439-89-6	Iron	19300.00			
7439-92-1	Lead	66.90	J		
7439-95-4	Magnesium	6330.00			
7439-96-5	Manganese	385.00			
7439-97-6	Mercury	0.12	U		
7440-02-0	Nickel	13.60			
7440-09-7	Potassium	2580.00			
7782-49-2	Selenium	1.50	UR		
7440-22-4	Silver	1.60	UJ		
7440-23-5	Sodium	199.00	J		
7440-28-0	Thallium	0.31	J		
7440-62-2	Vanadium	21.50			
7440-66-6	Zinc	110.00	J		
	Cyanide				

SOM 4/14/88

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: BROWN Clarity After: _____ Artifacts: YES

Comments:

LARGE STONES AND ROOTS